

REMARKS/ARGUMENTS

At the outset, independent Claims 1 and 5 recite “an extraneous matter removing system for a steam turbine comprising a casing, a duct, and turbine blades provided with a moving blade which rotates together with a rotor and a stator blade which is located on the upstream side of said moving blade and is held on the casing side and are housed in said duct, wherein said moving blade is rotated by a fluid introduced into said duct, wherein said system comprises: a pressure gage for detecting the pressure in said duct; ...”

It should be noted that the pressure in the duct is proportional to the steam nozzle stage after pressure as shown in Fig. 4 of the current application. Thus, by placing the pressure gage in close proximity to the steam nozzle and the moving blade (3) such that the pressure in the duct is directly detected, the input from the pressure gage essentially represents the steam nozzle stage after pressure. Increases in the steam nozzle after stage pressure correlate to extraneous matter building up on the blades. Therefore, the control unit (24) can be operated as exemplified in Fig. 5 to remove extraneous matter when necessary. Since an actual adhesion of extraneous matter can be detected in a timely manner due to the location of the pressure gage, the matter can be effectively removed without affecting the performance and the mechanical strength of a steam turbine.

I. Rejections under 35 U.S.C. 103(a)

To establish a *prima facie* case of obviousness the prior art references must teach or suggest all claim limitations. Accordingly, the Examiner has failed to prove a *prima facie* case of obviousness because the references cited do not teach or suggest each and every claimed limitation.

A. Rejection of Claims 1-3

Claims 1-3 stand rejected under 35 U.S.C. 103(a) as being unpatentable over JP 60-69214 to Hibara (hereinafter “Hibara”) in view of U.S. Patent No. 4,548,040 to Miller et al. (hereinafter “Miller”). The Examiner contends that it would have been obvious to one of ordinary skill in the art to modify Hibara with Miller for the benefit of the efficient control of cleaning when

necessary. However, a mere combination of Hibara with Miller will not result in the present invention because the combination of Hibara and Miller fail to teach or suggest each and every element of independent Claim 1. In particular, both Hibara and Miller fail to teach or suggest a pressure gage for detecting the pressure in the duct as recited in Claim 1.

Hibara is directed to a specific nozzle for the spouting of pressurized water to prevent adhesion of scale build up in a steam turbine. More specifically, Hibara only teaches a nozzle configuration for discharging pressurized water. Hibara fails to explicitly or implicitly teach or suggest an extraneous matter removing system for a steam turbine including a control unit for regulating the opening of a valve according to a pressure gage detecting the pressure in the duct, as recited in Claim 1, so that the valve is opened when the detected pressure has a value between a predetermined minimum pressure and a predetermined maximum pressure. Furthermore, Hibara simply provides no guidance in constructing any such system. Hibara merely discloses one such element; namely, a nozzle. Therefore, Hibara does not teach or suggest each and every element of Claim 1.

Miller is directed to a method of detecting when the performance of a compressor for a turbocharger has degraded and initiating a water injection system to supply high pressure water to the exhaust gas powering the turbocharger to clean the turbine blades. However, Miller simply fails to teach or suggest a pressure gage for detecting the pressure in the duct as recited in Claim 1. Miller does not discuss the desirability of providing a pressure gage in close proximity to the steam nozzle and moving blade (3) such that the duct pressure is detected as currently claimed. Instead, Miller teaches providing a pressure transducer (54) located at the outlet of the turbocharger (10). This means that the pressure reading, unlike the currently claimed invention, is not taken in close proximity to the moving blade nor the outlet of the steam nozzle to monitor the steam nozzle stage after pressure.

Miller's teaching of providing a pressure transducer (54) located at the outlet of the turbocharger (10) is completely different from the system currently claimed. For instance, the currently claimed system detects pressure in the proximity of the steam nozzle and the moving blade (3) which is actually the very place where extraneous matter adheres. An increase of the steam nozzle stage after pressure represents an actual adhesion of extraneous matter. By

contrast, the systems contemplated by Miller merely indicate a decrease in performance of a turbocharger, which is not necessarily indicative of the turbine blades becoming dirty or fouled. In particular, decreased performance as indicated by a pressure transducer on the outlet of a turbocharger may very likely be due to various other factors such as a decline in the performance of the turbine itself and/or the turbocharger, an increase of mechanical loss of bearing, and reduction of the temperature and/or reduction of the flow rate of the high temperature gas. As such, systems contemplated by Miller will very likely inject water unnecessarily and exacerbate erosion of the moving blade of the turbine and lead to a harmful effect on mechanical strength of the blade.

Since both Hibara and Miller fail to teach or suggest a pressure gage for detecting the pressure in the duct as recited in Claim 1, any combination of these references also fails to teach or suggest each and every claimed element as recited in Claim 1 or any claims dependent thereon. In light of the foregoing statements, it is respectfully submitted that the rejections of Claims 1-3 under 35 U.S.C. 103(a) have been overcome.

B. Rejection of Claim 5

Claim 5 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Miller.

As discussed above, Miller is directed to a method of detecting when the performance of a compressor for a turbocharger has degraded and initiates a water injection system to supply high pressure water to the exhaust gas powering the turbocharger to clean the turbine blades. Likewise, Miller simply fails to teach or suggest a pressure gage for detecting the pressure in the duct as recited in Claim 5. Miller only teaches or suggests providing a pressure transducer (54) located at the outlet of the turbocharger (10). Also as discussed in detail above, Miller does not provide any motivation or suggestion as to the desirability of providing a pressure gage for detecting the pressure in the duct as also recited in Claim 5.

Since Miller fails to teach or suggest each and every claimed element as recited in Claim 5, namely a pressure gage for detecting the pressure in the duct, it is respectfully submitted that the rejection of Claim 5 under 35 U.S.C. 103(a) have been overcome.

C. Rejection of Claims 4 and 6-7

Claim 4 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Hibara and Miller, and further in view of U.S. Patent No. 4,384,452 to Rice (hereinafter "Rice"). Claims 6-7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miller in view of Rice. Claim 4 is dependent upon Claim 1 and Claims 6 and 7 are dependent upon Claim 5. Both Claim 1 and 5 recite a pressure gage for detecting the pressure in the duct. Accordingly, dependent Claims 4, 6 and 7 also currently recite this element.

In general, Rice is directed to a gas turbine using steam as a blade coolant instead of air. Rice teaches that steam is a superior coolant than air due to its preferred physical properties such as its thermal conductivity, specific heat, lower viscosity etc... Rice also teaches that hot corrosion is a concern due to the elevated temperatures of gas turbines. Providing a steam blanket over much of the blades as taught in Rice protects the steam covered areas (sections of the blades) from direct contact with the corrosive products of combustion. However, Rice teaches that a steam blanket cannot adequately protect the leading edges of the blades and therefore require a protective coating from the heat of the moving fluid. Accordingly, Rice teaches the use of protective coatings on leading edges because they are not adequately covered by the steam coolant.

Similar to Hibara and Miller, Rice fails to teach every element of the currently claimed invention. Specifically, Rice also fails to teach or suggest an extraneous matter removing system for a steam turbine including a pressure gage for detecting the pressure in the duct. As such, Rice does not teach or suggest each and every element of Claims 1 and 5 or any claims dependent thereon (Claims 4, 6 and 7). Additionally, the obviousness rejection offers mere conclusions to indicate why one of ordinary skill in the art would seek to combine the teachings of the cited references. Conclusory statements are insufficient to establish a prima facie case of obviousness.

For these and the other reasons stated above, it is respectfully submitted that the rejections of Claims 4, 6 and 7 under 35 U.S.C. §103 (a) have been overcome.

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II. Conclusion

In view of the remarks made above, Applicant submits that the pending Claims are in condition for allowance. Applicant respectfully requests that the claims be allowed to issue. If the Examiner wishes to discuss the application or the comments herein, the Examiner is urged to contact the undersigned.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



John E. Johnson, III
Registration No. 58,367

Customer No. 00826
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Charlotte Office (704) 444-1000
Fax Charlotte Office (704) 444-1111
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